

# Ocean-Atmosphere Sensor Integration System (OASIS)

**Region:** Mid-Atlantic

**Date Project Initiated:** September 2003  
(current number: NA03NOS4730220)

## Brief Project Summary

The goal of this project is to develop a regional coastal ocean observing system along the Delmarva (Delaware, Maryland, and Virginia) coast that will become a key component of the nation's Integrated Ocean Observing System. Through the project, scientists are creating and testing sensors, platforms, and applications to support National Oceanic and Atmospheric Administration (NOAA) and NASA coastal ocean remote sensing activities and products. The regional observing system includes two coastal radar systems, a fleet of solar-powered surface autonomous vehicles, a coastal ocean bio-optical buoy, and a series of coastal surveying ships.

## Key Accomplishments

### *Air-Sea Interactions*

- Carbon dioxide plays an important role in climate variability, and understanding the role that coastal oceans play in the carbon dioxide cycle is crucial for establishing realistic climate predictions. Working with researchers at Columbia University and the NOAA Environmental Testing Laboratory, Coastal Observation II is developing a capability to use OASIS platforms to facilitate autonomous in-situ measurement of air-sea heat and carbon dioxide fluxes. Acquiring large amounts of data on these fluxes is critical for supporting the development of potential satellite-derived algorithms. Air-sea flux surveys are being planned for the eastern shore of Virginia and near Duck, North Carolina.

### *Autonomous Guidance Navigation and Control Software*

- An autonomous guidance navigation and control (GNC) software solution has been developed to support the OASIS platform, allowing users to command and control the OASIS platforms remotely. The autonomous GNC software uses "fuzzy logic" to navigate the platforms along predefined paths, regardless of the currents through which they are moving. The software has a station-keeping mode which allows the platform to behave as though it were moored to the ocean bottom. The goal is to have OASIS platforms augment the NOAA National Data Buoy weather buoys and improve weather forecasts while reducing costs.

### *COastal raDAR (CODAR) Coastal Surface Currents*

- A suite of three long-range SeaSonde radars is being deployed along the eastern shore of Virginia that will link with other radar systems in New Jersey and North Carolina, providing critical data to government, industry, and academia. This radar system will provide real time hourly observations of the surface ocean current field along the coast to some 200 kilometers offshore, an area for which such data are currently not available. This real-time data will support a variety of coastal observing science and user applications ranging from surface current mapping for commercial shipping, real-time ocean currents for climate studies, coastal modeling, pollution control and prediction, and search and rescue.

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This project is contributing to the Integrated Ocean Observing Systems (IOOS) by

- Providing air-sea flux measurements to assist in the development of satellite products
- Augmenting National Data Buoy Center oceanographic and weather data to improve weather forecasts
- Providing real-time surface current observations to support commercial shipping, climate studies, coastal modeling, pollution control and prediction, and search and rescue operations
- Creating educational and outreach materials for classrooms and the public about cutting-edge coastal oceanography research



### ***CODAR Search and Rescue***

- Various surface mapping radar data sets are being pooled with data from other radar systems already in place along the eastern U.S. seaboard to support the U.S. Coast Guard's real-time search and rescue application, SAROPS. Hourly surface current maps are archived and made available to the Coast Guard. This system was designed for use with surface radar maps from CODAR systems.

### ***Data Archival and Distribution***

- The operational Coastal Distributed Active Archive Center (CODAAC) will archive and distribute to the user community the large data sets collected on coastal observations in this region. CODAAC will be a secondary archive site for the East Coast CODAR data sets. It also will support the data archival needs for the Middle Atlantic Coastal Ocean Observing Regional Association (MACOORA). A Web browser capability using Google Earth can be used to view available data sets and to download individual data (<http://coastal.wff.nasa.gov>).

### ***Education and Outreach***

- To engage and encourage high school and college students, this project has developed an oceanography education journal, *Rising Tides*, that incorporates cutting-edge coastal oceanography research articles with classroom-friendly teacher resources, such as lesson activities, laboratory experiments, further readings, Web site information, and satellite to microscopic imagery. This effort includes significant contributions from NASA, NOAA, and over 15 educational institutions. A museum display focusing on the past, present, and future of coastal research is also being created. The exhibit will premier at the NASA Wallops Flight Facility's visitors' center and will then be displayed at other venues.

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### **Project Web Site**

[www.Coastalobs.US](http://www.Coastalobs.US)

